The first year of a midwifery-led model of care in Far North Queensland

Samantha Scherman, Jan Smith and Megan Davidson

ABSTRACT

Objective: To describe a midwifery-led model of care in Far North Queensland and the outcomes obtained in its first year of operation.

Design, setting and participants: Prospective analysis of data for all women who were booked for antenatal care with the midwifery-led unit at Mareeba District Hospital (MDH) and who gave birth during its first year of operation, from 27 June 2005 to 30 June 2006.

Main outcome measures: Number of women giving birth at MDH; antenatal, intrapartum and postpartum transfers to a higher-level referral centre (Cairns Base Hospital [CBH]); and labour and delivery outcomes.

Results: Of the 203 women who were booked for antenatal care at MDH and gave birth in the 12-month period, 170 were categorised as low risk and suitable to give birth at MDH. Of these, 147 (86%) did give birth at MDH, while 17 women (10%) had their care transferred antenatally to CBH, and six (4%) were transferred intrapartum. Of the 33 women categorised as high risk, 22 (67%) gave birth at CBH as planned, seven (21%) had elective caesarean sections performed by a general practitioner at MDH, and four (12%) presented to MDH in labour and gave birth there with no complications. Of the 158 women who gave birth at MDH, 146 (92%) had a spontaneous vertex delivery.

Conclusion: Outcomes for the first year of operation of the midwifery-led model of care are consistent with a viable maternity unit, with delivery outcomes and transfer rates that compare favourably with other similar units in Australia.

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Mareeba, a town 64 km south-west of Cairns in Far North Queensland, has a population of 8000. For the period 2000–2004, there was an average of 196 births per year at Mareeba District Hospital (MDH). In May 2005, due to the inability to recruit sufficiently skilled hospital medical officers to MDH, the hospital's maternity service was closed. Six weeks later, the service re-opened as a midwifery-led model of care, with Cairns Base Hospital (CBH) functioning as a higher-level referral centre. The midwifery-led unit at MDH gives low-risk women the option to give birth at their local hospital, with care provided by a midwife. Outpatient antenatal care and inpatient intrapartum and postpartum care is provided by the midwives on a 24-hour basis.

Twelve midwives work in the unit; three in a full-time capacity. Antenatal and intrapartum care is usually undertaken by each woman's chosen or allocated midwife, although core midwives working overnight can also provide intrapartum care. All midwives are expected to be credentialled in various skills (eg, perineal suturing) through in-house assessment.

Here, we describe the outcomes of the first year of the unit's operation, from 27 June 2005 to 30 June 2006.

METHODS

All women booked with the MDH unit have a case conference with an obstetrician from CBH on a monthly basis. The Australian College of Midwives' *National midwifery guidelines for consultation and referral*[1] (outlined in Box 1) are used to determine level of risk and any indications for transfer of care for each woman, with some modification to suit local requirements. For example, women in category C are generally those who, due to various risk factors, are planned to give birth at CBH. The exceptions to this are women who are planned for elective caesarean section, which would automatically place them in category C, but whose caesarean section is planned to be done at MDH. These women choose to share care between the midwives and their local general practitioner, who performs the caesarean section. Some higher-risk women who are planned to give birth at CBH are offered shared antenatal care between the MDH midwives and the antenatal clinic at CBH (after initial review of the individual case), to limit the need for the women to travel to Cairns for review.

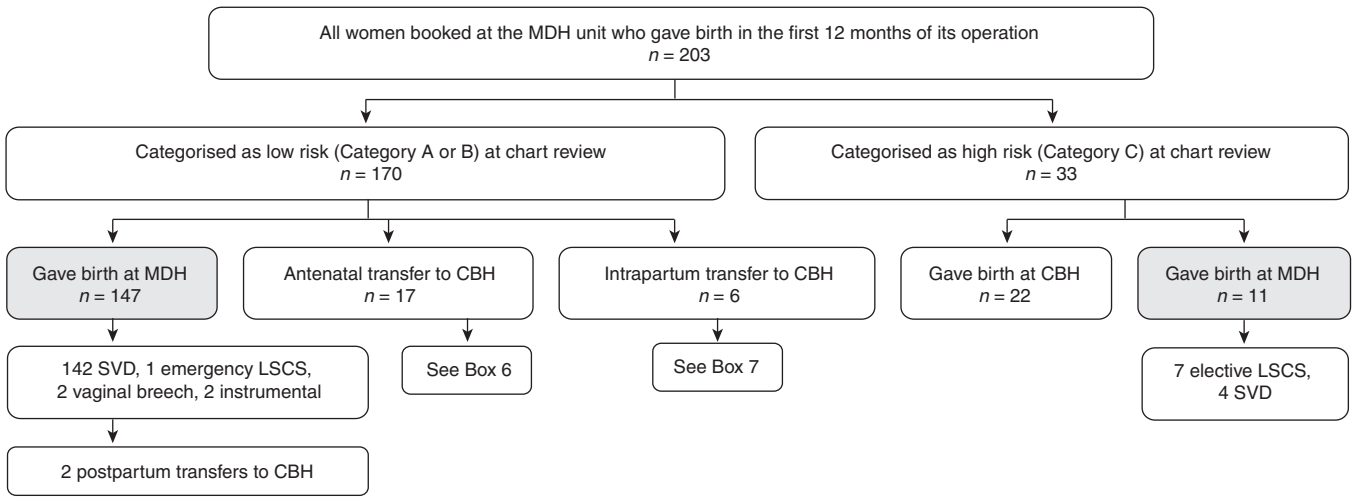
All emergency care and pregnancy complications are overseen by an obstetrician from CBH. This is done by phone consultation, inpatient review at CBH, review at MDH by the obstetrician (who visits once a month), or review at CBH's day pregnancy assessment unit or antenatal clinic. The MDH medical officers are available to give basic medical assistance in an emergency, and the local GPs, when available, have also

1 Australian College of Midwives' categories for consultation and referral[1]

Category	Description	Care provider	Example	MDH modified code
A: primary maternity care	Responsibility for maternity care is with midwife	Midwife	Previous manual removal of placenta	Category B
B: consultation and possible transfer of care to medical practitioner	Individual situation assessed, and arrangements made for responsibility for maternity care	Medical practitioner and/or midwife depending on agreements reached	Previous caesarean section — category B/C	Category C
C: transfer of care to medical practitioner	Situation requires medical care at secondary or tertiary level	Medical practitioner, with ongoing midwifery care or support where appropriate	Previous eclampsia	No modification

MDH = Mareeba District Hospital. ◆

2 Progression of care for 203 women initially booked at Mareeba District Hospital (MDH) maternity unit who gave birth in the first 12 months of the unit's operation



CBH = Cairns Base Hospital. SVD = spontaneous vertex delivery. LSCS = lower segment caesarean section. ◆

supported the unit at times of need, although the management decisions for all complications are made through consultation between the midwives and the obstetrician on call at CBH. There are currently four GPs in Mareeba with appropriate obstetric and anaesthetic skills who can be called on when urgent medical intervention is required. Facilities exist at MDH for continuous electronic fetal heart monitoring. Women requiring repair of third-degree or fourth-degree tears are transferred to CBH. Women requiring intrapartum or postpartum transfer are transported to CBH by a Queensland Ambulance Service road ambulance, with a midwife escort.

All women booking at MDH are made aware of the model of care and its potential limitations (eg, inability to offer epidural services for analgesia in labour). Information about the model is given to the women both verbally and in writing.

The data for this audit were collected prospectively by the unit midwives. Figures for each month were reviewed by the unit clinical nurse coordinator and the visiting obstetrician at the end of each 4-week period. Missing data were followed up by review of the relevant charts.

RESULTS

From 27 June 2005 to 30 June 2006, 203 women who were booked and received antenatal care from the midwives at MDH gave birth, with 158 (78%) doing so at MDH. The remaining 45 women (22%) had their care transferred antenatally (n = 17), intrapartum (n = 6), or had been initially categorised as high risk (category C) (n = 22) and were therefore always planned to give birth at CBH. Box 2 shows the progression of care for the 203 women.

Box 3 shows the distribution of women who gave birth at MDH according to age, ethnicity and parity. Thirty-three women (21%) were of Aboriginal or Torres Strait Islander descent, which is nearly four times the Queensland average of 5.5%.[1]

Modes of delivery at MDH are given in Box 4. Of the 158 women, 146 (92%) had a spontaneous vertex delivery (SVD). There were eight caesarean sections performed by local GPs: seven elective, and one emergency (for failure to progress). There were two instrumental deliveries: one involved a midwife performing Kiwi OmniCup (Clinical Innovations Europe, Abingdon, UK) vacuum extraction for fetal bradycardia, with the fetal head on the perineum; and the other was a Wrigley's forceps delivery by one of the GPs after a failed Kiwi cup vacuum attempt by the midwives. This was to expedite delivery in a primiparous woman having an eclamptic seizure during the second stage. Neither instrumentally delivered baby required any significant resuscitative measures. There were two breech births, involving one woman at term, and one at 35 weeks' gestation who presented in labour. Both women proceeded to uneventful vaginal breech deliveries, and neither baby required any significant resuscitative measures.

Labour and delivery outcomes for the 150 women who had vaginal births at MDH are

3 Age, ethnicity and parity of 158 women who gave birth at Mareeba District Hospital

	Number (%)	State average (%)*
Age (years)		
15–18	8 (5.1%)	
19–25	56 (35.4%)	
26–35	78 (49.4%)	
36–40	14 (8.9%)	
> 40	2 (1.3%)	
Ethnicity		
ATSI	33 (20.9%)	5.5%
Non-ATSI	125 (79.1%)	94.5%
Parity		
Nulliparous†	49 (31.0%)	40.7%
Multiparous‡	96 (60.8%)	54.8%
Grandmultiparous§	13 (8.2%)	4.6%

ATSI = woman identified herself as being of Aboriginal or Torres Strait Islander descent.
* For Queensland in 2004.[2] † Has never previously delivered a baby of more than 20 weeks' gestation. ‡ Has previously delivered at least one baby of more than 20 weeks' gestation. § Has previously delivered at least four babies of more than 20 weeks' gestation. ◆

4 Modes of delivery at Mareeba District Hospital (MDH)

	Gave birth at MDH	Gave birth at MDH plus intrapartum transfers	State average (%)*
Spontaneous vertex delivery	146 (92.4%)	150 (91.5%)	60.9%
LSCS (emergency)	1 (0.6%)	2 (1.2%)	30.7%†
LSCS (elective)	7 (4.4%)	7 (4.3%)	
Instrumental delivery	2 (1.3%)	3 (1.8%)	8.0%
Vaginal breech	2 (1.3%)	2 (1.2%)	0.4%
Total	158	164	

LSCS = lower segment caesarean section. * For Queensland in 2004.[2] † Total caesarean section rate. ◆

5 Labour and delivery outcomes for 150 women who had a vaginal birth at Mareeba District Hospital

	Number (%)	State average (%)*
Analgesia use		
None	100 (66.7%)	36.4%
Nitrous oxide	30 (20.0%)	62.4%
Narcotic	20 (13.3%)	35.3%
Perineal injury		
None	109 (72.7%)	36.3%
First degree	26 (17.3%)	20.5%
Second degree	13 (8.7%)	21.3%
Third/fourth degree	0	1.1%
Episiotomy	2 (1.3%)	12.4%
Postpartum blood loss		
< 250 mL	73 (48.7%)	
250–599 mL	65 (43.3%)	
600–1000 mL	11 (7.3%)	
> 1000 mL	1 (0.7%)	
Average length of labour		
First stage	6 h 10 min	
Second stage	30 min	
Third stage	18 min	

*For Queensland in 2004.[2] ◆

shown in Box 5. Most ($n = 138$; 92%) had a postpartum blood loss of less than 600 mL. One woman, whose blood loss exceeded 1000 mL, had a precipitate vaginal delivery of her third baby, and was transferred to CBH after bleeding failed to settle with intravenous oxytocin infusion, intramuscular injection of ergometrine maleate–oxytocin, and misoprostol per rectum, as ordered by the obstetrician on call. On arrival at CBH, her total estimated blood loss was 2000 mL. She was haemodynamically stable, and examination under anaesthetic revealed an empty and well contracted uterus. Some small ongoing bleeding was noted from a second-degree tear that had been sutured at MDH. This was resutured and there was minimal ongoing bleeding. The woman received 3 units of packed cells. There were no obvious risk factors for postpartum haemorrhage noted before labour.

Of the 203 women who gave birth in the 12-month period, 147 (73%) had been judged at the initial case conference to be a category A risk, 23 (11%) as category B and 33 (16%) as category C. During the 12 months, 17 (10%) of the women in category A or B had their care transferred antenatally to CBH. Box 6 shows the reasons for antenatal transfer.

During the intrapartum period, six women in category A or B (4%) were transferred to CBH. The reasons for transfer and outcomes are given in Box 7.

Two women were transferred postnatally. The first was the woman with a significant postpartum haemorrhage (described above), and the second was the woman who had eclampsia in the second stage. This woman had not been hypertensive during labour, and her highest recorded blood pressure was 150/100 mmHg immediately after the seizure. She was given a loading dose of magnesium sulfate (as per unit protocol) immediately after the seizure, and a magnesium sulfate infusion was commenced before transfer to CBH. She was given 5 mg intravenous hydralazine after delivery. Her blood pressure on arrival at CBH was 120/75 mmHg, and she was also stable otherwise. Subsequent blood test results were consistent with HELLP (haemolysis, elevated liver enzymes and low platelets) syndrome. The woman continued to be treated with magnesium sulfate for 36 hours and required no other antihypertensives. Her baby's birthweight was 2960 g.

All women transferred antenatally, intrapartum or postnatally were in category A or B. Four of the 33 women in category C (12%) who were planned to give birth at CBH presented to MDH in established labour; transfer was considered inappropri-

6 Reasons for antenatal transfer to Cairns Base Hospital

Indication for transfer	No. of women	% of category A/B
Hypertension/pre-eclampsia	5	2.9%
PROM	3	1.8%
PPROM	2	1.2%
Threatened preterm labour	2	1.2%
Medical condition	2	1.2%
Social induction of labour	1	0.6%
Prolonged pregnancy	1	0.6%
Antepartum haemorrhage	1	0.6%
Total	17	10.0%

PROM = prelabour rupture of membranes at term.
PPROM = prelabour preterm rupture of membranes. ◆

7 Reasons for intrapartum transfer to Cairns Base Hospital and outcomes

Case	Parity	Indication for transfer	Mode of delivery
1	Nulliparous	Requesting epidural	SVD
2	Multiparous	Requesting epidural	SVD
3	Nulliparous	Prolonged first stage	SVD
4	Nulliparous	Prolonged first stage	Vacuum extraction for fetal distress at second stage
5	Nulliparous	Prolonged first stage	SVD
6	Nulliparous	Prolonged first stage	LSCS for failure to progress

SVD = spontaneous vertex delivery.
LSCS = lower segment caesarean section. ◆

ate and they gave birth at MDH. The obstetrician on call at CBH was notified when these women presented to MDH; all of them progressed to uneventful SVDs. The remaining 22 women in category C who were planned to give birth at CBH did so.

The time interval between the decision to transfer and arrival at CBH varied. For the two postnatally transferred patients, transfer times were 2 h 40 min and 3 h 25 min (mean, 3 h 7 min). For the four of six intrapartum transfers where this interval could be identified from the notes, the transfer time varied between 1 h 20 min and 2 h 25 min (mean, 1 h 54 min).

The average Apgar score for babies born at MDH was 8 at 1 minute and 9 at 5 minutes. No babies had an Apgar score of less than 7 at 5 minutes. Of the babies born at MDH, 141 (89%) required no resuscitative measures (Box 8).

8 Neonatal resuscitation for 158 babies born at Mareeba District Hospital

	Number (%)	State average (%)*
No resuscitation	141 (89.2%)	41.4%
Required resuscitation†	17 (10.8%)	58.6%
Oral/pharyngeal suction	1 (0.6%)	20.7%
Oral/pharyngeal suction of meconium	3 (1.9%)	7.6%
Suction of meconium via ETT	0	0.8%
Facial oxygen	13 (8.2%)	28.9%
Bag and mask	8 (5.1%)	8.2%
IPPV via ETT	0	0.9%
Narcotic antagonist	2 (1.3%)	0.8%
External cardiac compression	0	0.2%

ETT = endotracheal tube. IPPV = intermittent positive pressure ventilation.
* For Queensland in 2004.[2] † Some babies required more than one resuscitative measure. ◆

DISCUSSION

In the first year of midwifery-led care at MDH, the antenatal and intrapartum transfer rates were lower than those reported by similar units in Australia. The antenatal transfer rate of 10% compares favourably with rates of 19%[3] and 22%[4] for other units. The intrapartum transfer rate of 4% at MDH is far lower than published rates for other units, which range from 18% to 76%.[3-7] However, it should be noted that the birth numbers at MDH at this stage are too low to draw any conclusions regarding the safety of this model of care in terms of major fetal and maternal morbidity and mortality.

Most intrapartum transfers from MDH (five of six) were in nulliparous women. Larger numbers would need to be acquired before suggestions could be made about the suitability of this model of care for primiparous women, particularly in regions where transfer and access to nearby obstetric and anaesthetic back-up are more difficult. Of interest, the longest transfer time (3 h 25 min) was for the post-eclamptic woman, who was the only woman transferred by air (helicopter) rather than by road, highlighting the potential delays arising from the additional organisation required for air transfer.

In general, women appear to have been supportive of this model of care, with very few deciding to change to a different model after their booking visit. However, one of the main difficulties faced by the unit is caused by a number of women in category C who present to MDH in labour, despite receiving advice to give birth at CBH. For those women who are thought likely to resist such advice, antenatal and intrapartum care plans are made for both contingencies of delivery at CBH and at MDH. In the unit's first year, all four of the women in category C who presented to MDH too late to be transferred gave birth with no maternal or neonatal complications. If the midwifery-led unit closed in an effort to prevent such category C deliveries at MDH, we believe that a significant proportion of these women would seek no antenatal care, and would still ultimately present in labour to MDH as a previously "unknown quantity".

CONCLUSION

Although we are satisfied with the outcomes of the first year of operation of this model of care, it should not be assumed that this model would be effective in other regions. Due consideration must be given to the characteristics of each individual institution before such a model is implemented. The characteristics of the Mareeba model that we feel have been essential to its favourable outcomes include: a dedicated and experienced midwifery team that was committed to implementing a new model of care; an extremely supportive community; a group of women using the service who were accepting of the potential limitations of the model; a higher-level centre that was willing to act as the referral centre for the unit; supportive and experienced local GPs; and criteria for categorising risk and suitability for delivery at Mareeba, which were strictly adhered to by the midwifery team. This approach has resulted in a viable maternity unit with outcomes that compare favourably with other similar units in Australia.

COMPETING INTERESTS

None identified.

AUTHOR DETAILS

Samantha Scherman, MB BS, FRANZCOG, Obstetrician Gynaecologist[1]
Jan Smith, RM, Clinical Nurse Consultant[2]
Megan Davidson, RM, Registered Midwife[2]
1 Department of Obstetrics and Gynaecology, Cairns Base Hospital, Cairns, QLD.
2 Maternity Unit, Mareeba District Hospital, Mareeba, QLD.
Correspondence:
sam.scherman@powerup.com.au

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